**Supplementary material 1**

The LA and MC-ICPMS parameters and the typical cup configuration are given below (Gehrels *et al*. 2008; Chang *et al*. 2006).

**Optimized Instrumental parameters**

|  |  |
| --- | --- |
| Laser Ablation system | Description/optimized value |
| Make | Photon Machine |
| Model | Analyte G2 |
| Type | Excimer |
| Wavelength | 193 nm |
| Repetition rate | 5 Hz |
| Energy density | 4 J cm-2 |
| Spot size | 15-35 µm |
| MFC1 | 0.6 l/min |
| MFC2MFC3(N2) | 0.4 l/min5 ml/min |
| Shot count |  175 |

|  |  |
| --- | --- |
| MC-ICPMS | Description/optimized value |
| Make | Thermo Fisher Scientific |
| Model | Neptune Plus |
| Cool Gas | 16 l/min |
| Auxiliary Gas | ~0.7 l/min |
| Sample Gas | ~0.931 l/min |
| RF Power | 1350 watts |
| Guard Electrode | Off |
|  |  |
| Detector ModeIntegration Time | Faraday+ICs0.5 s |
| Scan Mode | Static |

Cup Configuration

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Masses measured | Detector:Mass: | IC5202Hg | IC4204Pb+204Hg | IC2206Pb | IC1B207Pb | IC6208Pb | H3232Th | H4238U |